Abstract

Julie Dalziel, 4 October 2010

Impacts of Food on Intestinal Function & Health

The intestinal tract is responsible for nutrient digestion and absorption. It has a protective barrier function that includes: microbiological, chemical, epithelial, immunological and neural systems that are critical to normal intestinal function, innate immunity and health and wellbeing. Evidence suggests that intestinal barrier dysfunction contributes to pathological changes in distant organs and tissues. Underlying this is the hypothesis that intestinal permeability has a role in the pathogenesis of many conditions including inflammatory and allergic diseases. The controlled development of intestinal barrier function in infants is essential for normal intestinal maturation and development of the mucosal immune system. In adults, stress is known to compromise barrier function and in the aged, barrier function progressively deteriorates and is a risk factor for disease development.

Normal epithelial permeability is critical to nutrient absorption and intestinal barrier function. Epithelial permeability is sub-optimal in newborns but can be improved through supplementation. Similarly, the impaired permeability and age-related health issues can be restored by nutrition. The core research areas and expertise in: protein purification, food-host-microbe interactions, molecular nutrition, neuromotor function and membrane physiology will be outlined. Core capabilities include: functional genomics, microbiology, animal models, and cellular and tissue assays. Methods relevant to intestinal motility and permeability will be discussed since these aspects of barrier function require activation of ionic channels in cell membranes that we study using a variety of physiological assays. These include: a muscle contraction assay, fluorescent high through-put ion channel assays, trans-epithelial electrical resistance (TEER) assay, and electrophysiology (patch-clamping). This suite of techniques enables questions on impacts of food on health to be addressed using *in vitro* assays.

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